

Appln. No. 10/031,160
Amendment
Reply to Office Action dated July 23, 2003

Docket No. 304-777

REMARKS

The foregoing amendments and these remarks are in response to the Office Action dated July 23, 2003. This amendment is accompanied by a request for retroactive extension of time of two months, and authorization to charge Deposit Account No. 50-0951 for the appropriate fee therefor.

At the time of the Office Action, claims 1-21 were pending. In the Office Action, claims 1, 3-6, 8-14, 16 and 18 were rejected under 35 U.S.C. §102(b) and claims 2, 7, 15, 17 and 19-21 were rejected under 35 U.S.C. §103(a). The rejections and objections are set out in more detail below. New claims 22-27 are added herein, and authorization to charge Deposit Account No. 50-0951 the fee of \$348 for 3 independent claims in excess of three, and 5 additional claims in excess of twenty is attached.

I. Layout of the Specification

The Office Action included guidelines for the preferred layout of the specification. Applicant has amended and/or inserted headings as appropriate.

II. Rejections on Art

Claims 1, 3-6, 8-14, 16 and 18 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,316,624 to Davlin. Claims 2 and 17 were rejected under 35 U.S.C. §103(a) as being unpatentable over Davlin. Claims 7 and 15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Davlin in view of U.S. Patent No. 5,765,836 to Banker. Claim 19-21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Davlin in view of U.S. Patent No. 5,553,902 to Powers.

The Office Action lists features in the claims of the present application that are asserted to be disclosed by Davlin. The interpretation of Davlin set out in the Office Action is believed to be erroneous in parts. The assertions are discussed below.

Appln. No. 10/031,160

Dock t No. 304-777

Amendment

Reply to Office Action dated July 23, 2003

- a) The Office Action, in referring to the disclosure of Davlin, states that "the parts have mutually precisely complementary sealing surfaces". To the contrary, Davlin does not show complementary sealing surfaces. Surface 17 in part 11 is called an "annular recess" (see, for example, column 3, line 45) and Fig. 3 shows that it is conical. Protrusion 16 is shown as being curved. A conical surface and a curved surface cannot be precisely complementary. Accordingly, they cannot form a "clearance-free seal" as the Office Action states. Moreover, the Office Action is contradictory in stating that the sealing surfaces will be "limited to a narrow area" in Davlin, because if they were "precisely complementary" as asserted, there would be a broad sealing area.
- b) The Office Action further asserts that in Davlin the specific sealing pressure is in the "elastic deformation range", because the parts are made of metal. As is known, metals have, beside an initial range of elasticity, a great range of plastic deformation. Claim 3 of the present application, for example, defines that the predetermined sealing pressure is built up by only an elastic deformation of the parts. This avoids plastic deformation which would restrict the sealing system to only one use because, after detachment, the sealing parts would not be able to build up their initial predetermined sealing pressure because of the remaining plastic deformation.
- Davlin is silent as to the elasticity and plasticity of the joint, but if one reads column 5, lines 52 to 57, it is clear that the sealing surfaces 16, 17 are in danger of wearing and Davlin therefore has to use an intermediate sealing insert 38 which is what the sealing systems of the present claims avoid. Therefore, it can be taken from Davlin that there is plastic deformation instead of an elastic deformation only.
- c) The Office Action asserts that "the sealing surfaces have a mutual guidance transverse to the media area wall" in Davlin. This objection is obviously directed to original claim 4, which may be misunderstood in its original format. This claim is amended herein to clarify that there is a mutual guidance in addition to the sealing

Appln. No. 10/031,160

Docket No. 304-777

Amendment

Reply to Office Action dated July 23, 2003

- surfaces. It is clear that the sealing surfaces, which are not flat, provide a mutual guidance. In this case, however, there is an additional guidance to pre-center both parts of the joint in order to avoid the fragile sealing surfaces becoming damaged.
- d) Davlin is further asserted to disclose that the media carrying area walls of both parts are "truly aligned". It can be seen that this is not the case in any of the drawings of the reference. There is a considerable step between the smaller opening in part 12 and the larger opening in part 11. The media carrying area walls are, therefore, not truly aligned.
- e) In the first item of page 6 the Office Action asserts that the sealing lip 16 is received in the "corresponding" annular recess 17. This is not the case, as discussed under a) above.
- f) The Office Action asserts that the sealing pressure of Davlin "is predetermined by a stop 30 provided by a clamping device 13". However, it should be noted that nut 13 could be threaded until flange 27 abuts the right hand surface of part 11. This is, further, not a means of predetermining the sealing pressure, as the sealing parts, especially lip 16, would be destroyed by overstressing before this happens. Therefore, there is no predetermination of the sealing pressure at all in Davlin. On the other hand in the present sealing system the sealing pressure may be predetermined by abutment of both surfaces bordering gap 48 in Fig. 6. This is now more precisely defined in new claim 24.
- g) It was already stated in comment a) above that the conical surface 17 and the curved sealing lip 16 of Davlin do not correspond to each other. Therefore, they do not close the clearance between them but leave a small slit open to the media carrying openings 14, 15 which can create a bacterial breeding area.
- h) As to elastic deformation, see b). It should be noted that in Davlin the sealing lip 16 is, when deforming at all (elastically or plastically) forced inside, thereby narrowing opening 15 and hampering any flush alignment of the media carrying walls if there was any alignment to begin with.

Appln. No. 10/031,160

Docket No. 304-777

Amendment

Reply to Office Action dated July 23, 2003

- i) The Office Action asserts that in Devlin "the parts are made from an equally hard material". However, column 8 lines 28 to 42 of Devlin merely discloses suitable materials for the construction of the components, and does not teach that the components are formed of the same or equally hard materials. This can also not be proved by citation of an "access union".
 - j) In the last item on page 6 the Office Action states that Davlin calls for a specific sealing pressure in the range of 20 to 80 % of the yield point. However, this is not based on any teaching in the reference. To the contrary, the present sealing system may be limited to this value by the predetermination of the sealing pressure as discussed under f).
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Notwithstanding Applicant's disagreement with the interpretation of Davlin outlined in part above, the claims are amended herein to more clearly define the inventions therein.

In claim 1 the feature of the mutually complementary S-shaped profile has been added. This provides on one hand a precise flush alignment of the media carrying walls and on the other hand transforms the axial pressure of the parts into a pressure varying between axial and more radial directions steplessly. This makes it possible to provide a tight seal with an only elastic range pressure. This feature is clearly not taught or suggested in Davlin, or in any of the other cited references.

The last feature in claim 1 more clearly defines the "narrow area" of the sealing surfaces. The narrow area in which the S-shaped sealing surfaces are pressed together allow a sufficient sealing without overstressing the whole joint, and the limitation of the size of the contact surface is clearly not merely a change in the size of any prior design, as asserted in the Office Action.

New claim 22 contains the feature of pre-centering of the two parts which is not at all present in Davlin. There the only centering is done by the sealing surfaces themselves

Appln. No. 10/031,160
Amendment
Reply to Office Action dated July 23, 2003

Docket No. 304-777

which do not avoid a deviation of the middle axes because parts 11 and 12 may tilt somewhat.

New claim 23 contains a feature of the reserve sealing surfaces 21, 26, their relation to the sealing surfaces and the pressure distribution between them. The sealing pressure is greatest near the media carrying walls 30 and decreases gradually from the main sealing surfaces 20, 25 via the reserve sealing surfaces radially to the outside. In Davlin or the other references there is nothing taught with respect to any reserve sealing surfaces or this pressure distribution which takes care that there is no overstressing of the main sealing surfaces in any case.

New claim 24 is mentioned in comment f) above. It defines the stop faces between the parts which form a clearance before bracing the parts together, while unbracing the clearance is closed and thereby the sealing pressure is predetermined by abutment of the two stop faces bordering gap 48. There is no corresponding teaching in Davlin or other comparable references.

New claim 25 relates to an alternative to the last feature in claim 1 in which the width of the contact surface is given in absolute measures. New claim 26 combines some of the claims discussed above.

The other references cited by the Examiner have been studied by Applicant and do not teach or suggest a sealing system as claimed, which can create a joint which is, seen from the media carrying inside of the joint, nearly seamless without any step or gap in which dirt or bacteria may "hide" even during a cleaning action, which is detachable and re-useable for an undetermined number of times, and which doesn't use any intermediate material which may cause wear as flexible sealing rings do and which does not cause corrosion problems as metal sealing rings would do. For pharmaceutical and food use it is often unacceptable that even different materials are used within an apparatus to come in contact with the content.

Appln. No. 10/031,160
Amendment
Reply to Office Action dated July 23, 2003


Docket No. 304-777

III. Conclusion

Applicant has made every effort to present claims which distinguish over the prior art, and it is believed that all claims are in condition for allowance. Nevertheless, Applicant invites the Examiner to call the undersigned if it is believed that a telephonic interview would expedite the prosecution of the application to an allowance. In view of the foregoing remarks, Applicant respectfully requests reconsideration and prompt allowance of the pending claims.

Respectfully submitted,

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Docket No. 304-777